

INVENTOR: JAMES ANTHONY
BALNAVES ET AL.
TITLE: METHOD AND APPARATUS FOR
MULTIMEDIA EDITING
Sheet 1 of 19 Appln. no. 09/407,293
Docket No.: 00169.001468

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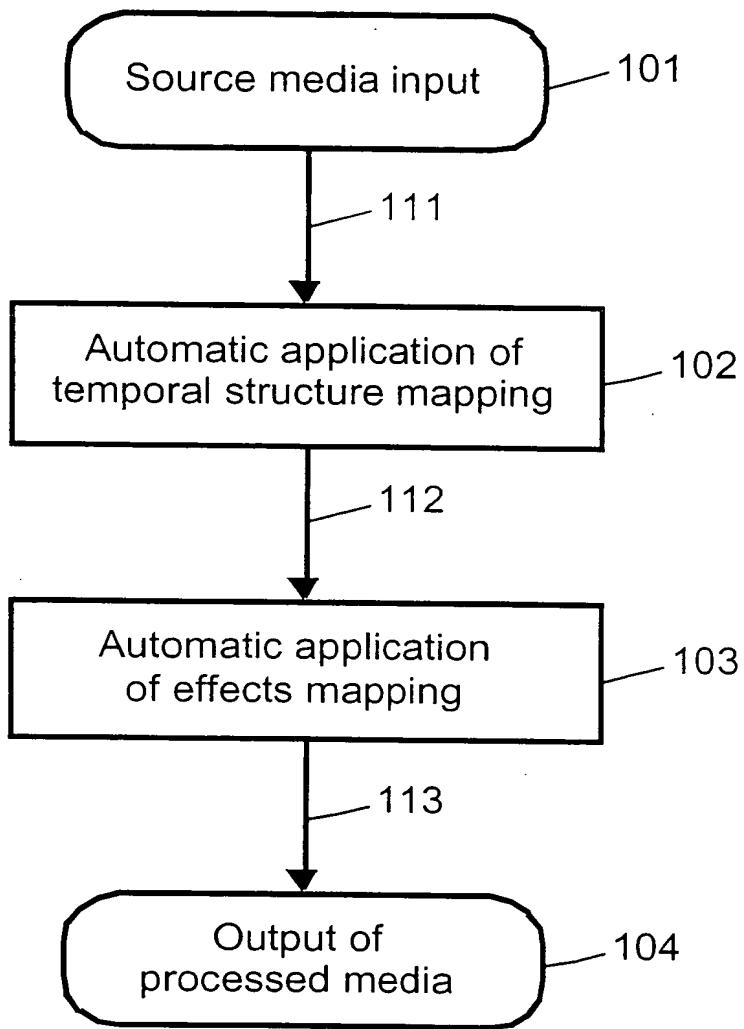


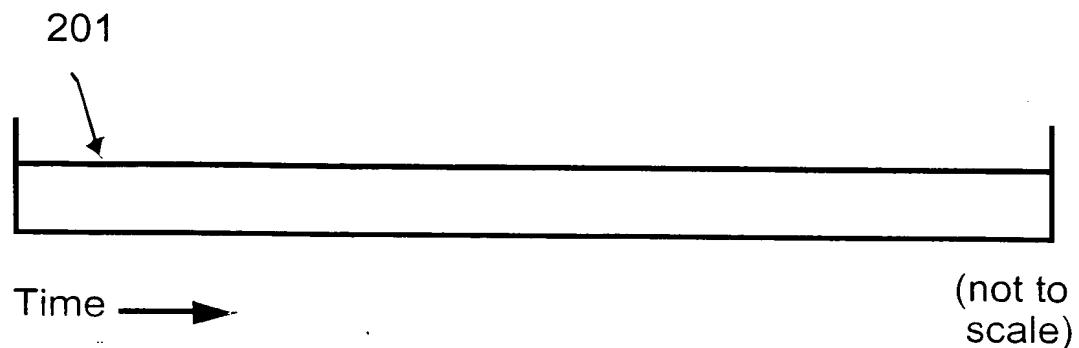
Fig. 1

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Total Duration: 38min, 50sec

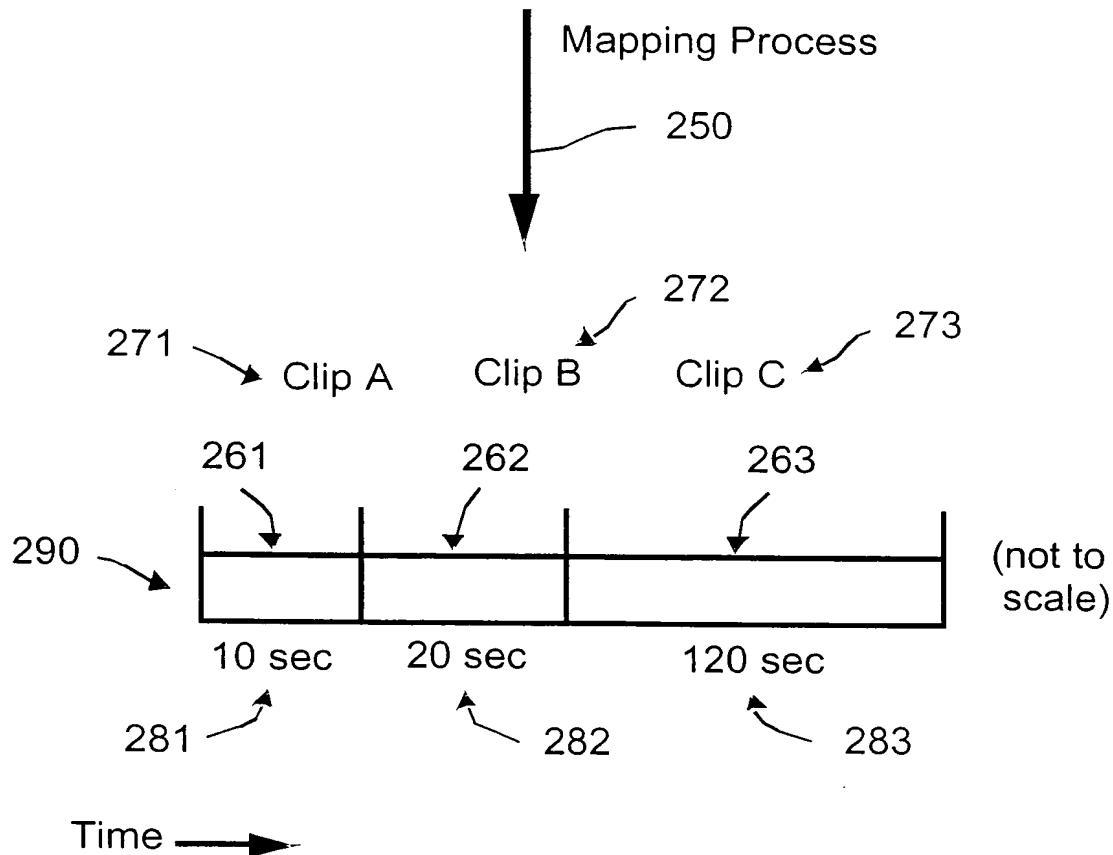


Fig. 2

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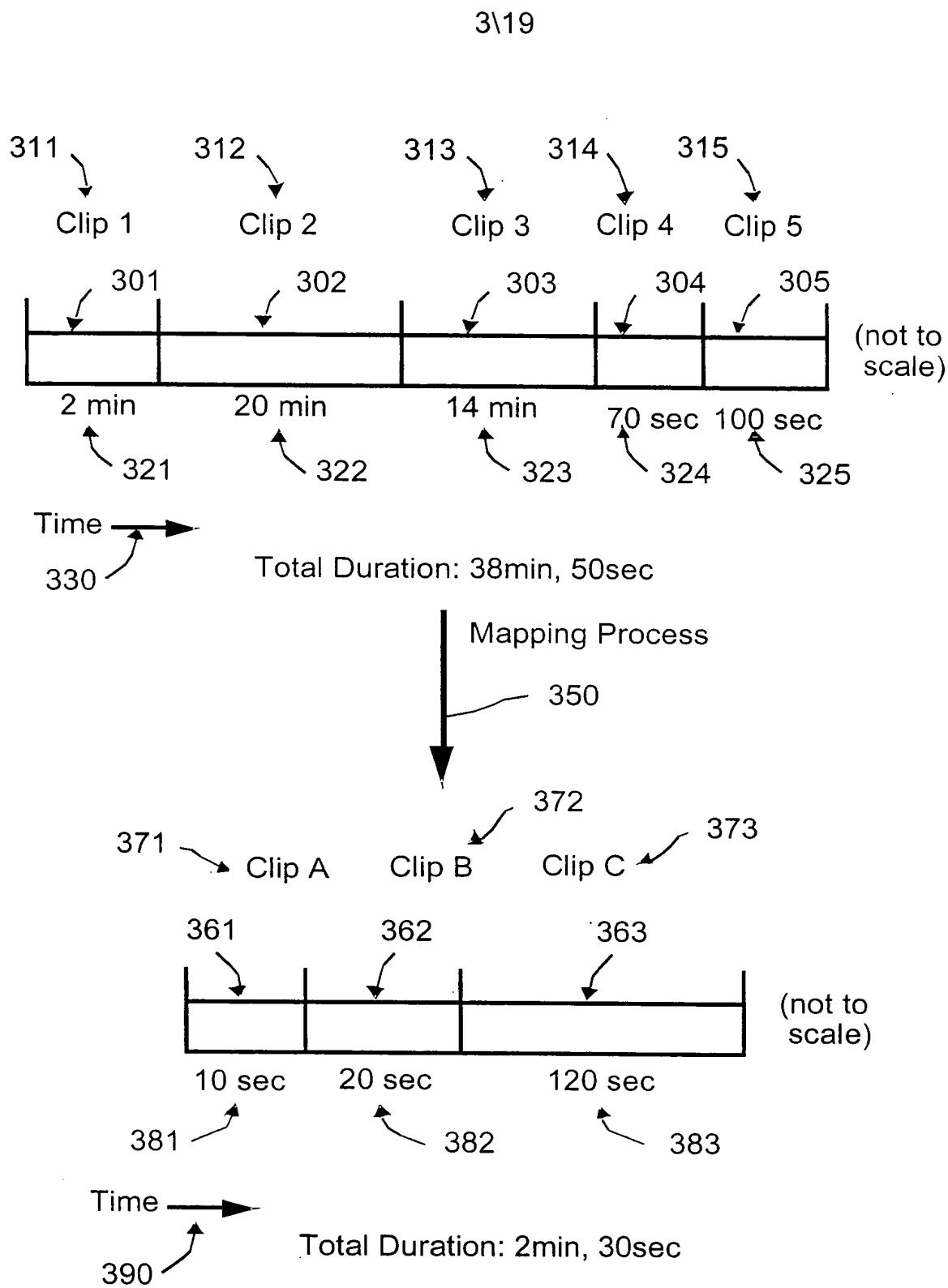


Fig. 3

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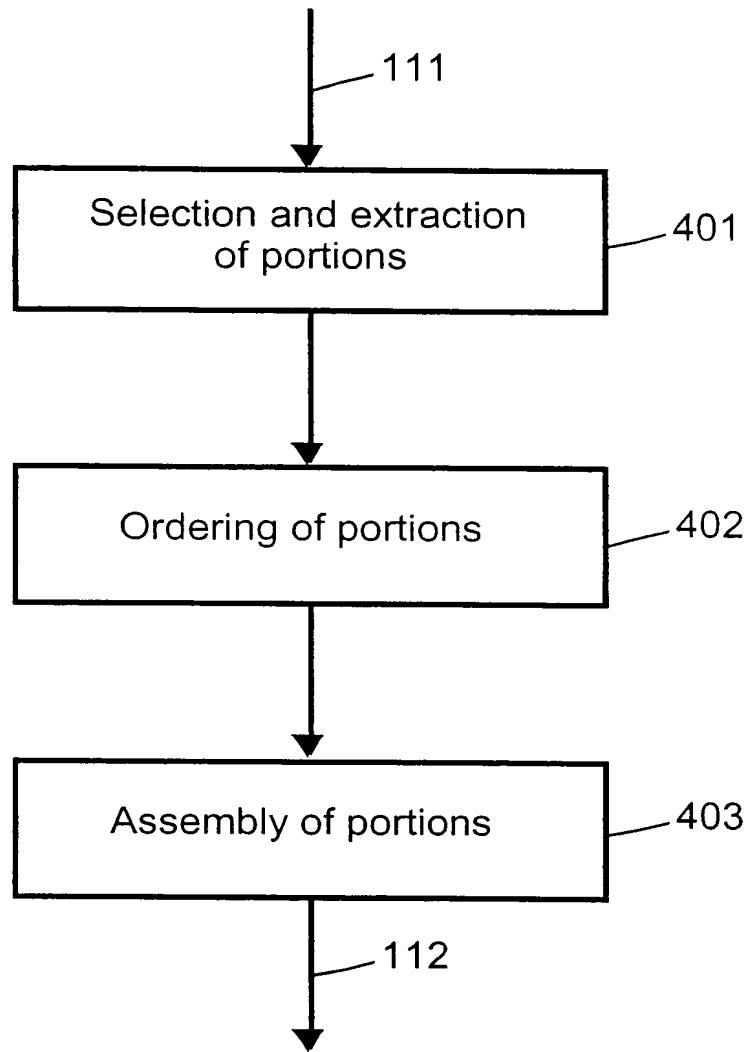


Fig. 4

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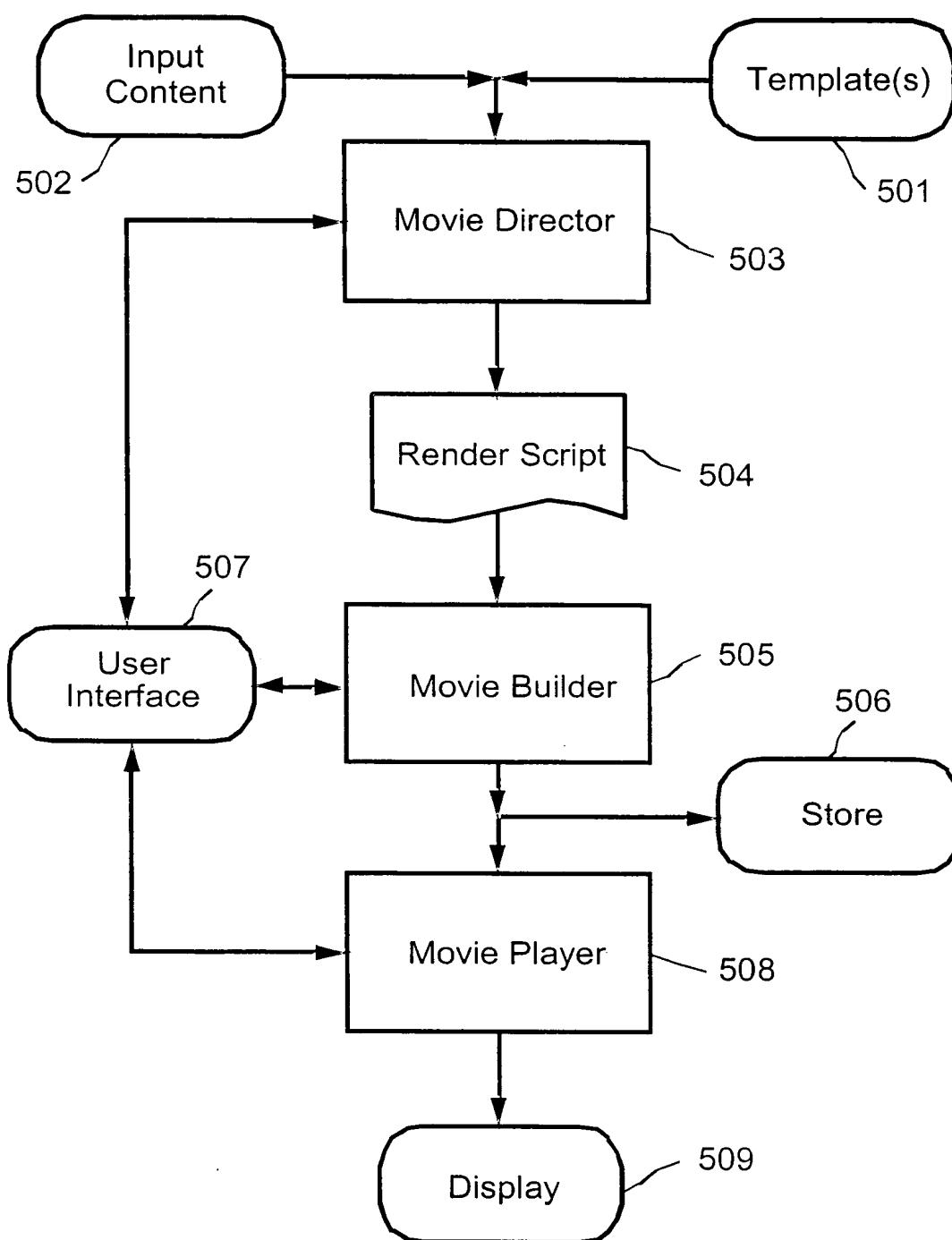


Fig. 5

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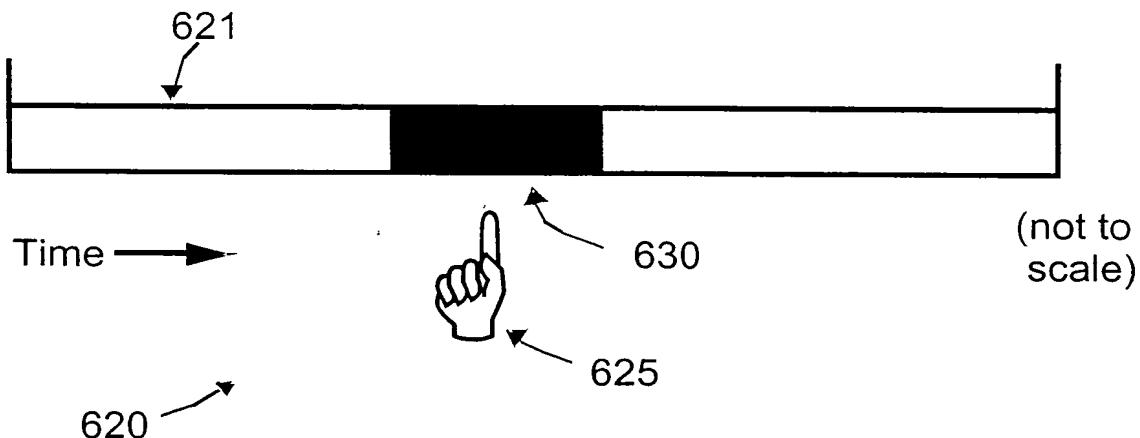
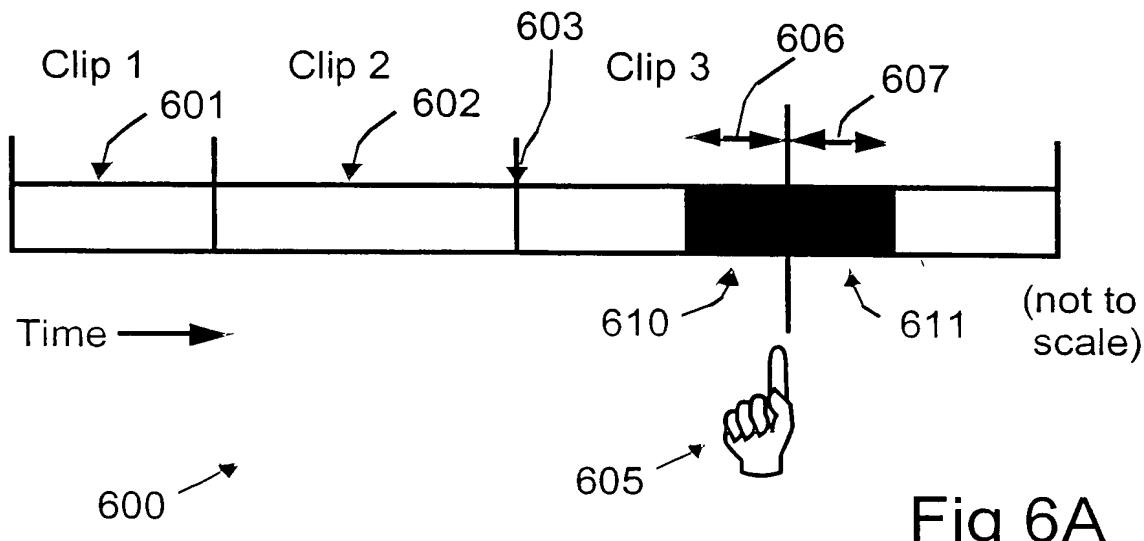
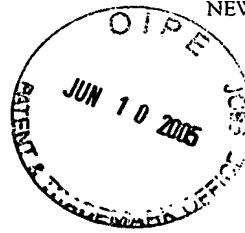


Fig. 6B

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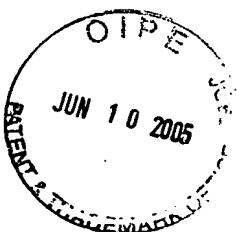


Selection and Extraction Method Examples

Selected Portion Start	Extracted Duration	Relationships between Selections
Within whole content.	Random.	Random, chronological, without overlap.
Within clip.	Less than or equal to clip length.	Random, chronology ignored, overlap ignored.
Within a group of clips.	Spanning one or more clips recorded within the same day.	From separate clips.
Heuristically obtained, eg. assume zones of interest in recorded content occur primarily near clip startpoints.	Heuristically obtained, eg. related to human attention span.	From a group of clips recorded within the same day.
Multi-pass (repetitious)	Limited so as to limit total output duration (eg. based on heuristics).	From all clips within whole content.
	Short durations followed by longer durations (eg. applied to multipass selection)	Repetitious, for instance, to lengthen output content duration with respect input content duration.

Fig. 8

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Ordering Method Examples
Sequential or chronological
Random
Reverse-chronological
Flashback (later chronologies displayed or duplicated early in the order)
Montage (later chronologies displayed in brief early in the order)
Cutaway (two related or consecutive portions separated by an unrelated or distant portion)
Alternate

Fig. 9

Assembly Method Examples
Cut (butt-edit)
Short Dissolve
Long Dissolve
Fast Wipe
Slow Wipe
Graphic

Fig. 10

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Effects Mapping Examples
Addition of Sound effect
Removal of chrominance
Addition of artificial scratches and dust
Composition or overlay of sprites, animation, graphics
Addition of Music
Luminance or chrominance keying or matteing
Dissolve or mixing of other content

Fig. 11



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Silent Movie Template Components Example	
Component	Purpose
Four well-separated random video selections from input content.	Selection of sufficiently differing activities or incidents from the input content to create surprise or reduce boredom.
Extract limited duration clips for each selection, each preferably less than 2 minutes in duration.	Limit clip duration to the effective viewer attention span and avoid boredom.
Filter clips to remove all chrominance information.	Replicate "black and white" characteristic of Silent Movie genre.
Remove original audio information.	Replicate silent characteristic of Silent Movie genre.
Add piano soundtrack.	Replicate characteristic of Silent Movie genre.
Insert dialogue mattes at clip boundaries.	Replicate characteristic of Silent Movie genre.
Apply scratch and dust filter.	Replicate characteristic of Silent Movie genre.
Cut in titles, dialogue mattes and clips.	Replicate hard-cut characteristic of Silent Movie genre.
Insert fade-in from black to title dialogue matte.	Include title in characteristic style of Silent Movie genre.
Insert fade-out to black from end-title dialogue matte.	Include end-title in characteristic style of Silent Movie genre.
Insert film projector sprocket hole sound over title.	Replicate projector sound-effect characteristic of Silent Movie genre.

Fig. 12



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Fig. 13

	Romance Montage	Action Montage	Continuity Template	Silent Movie
Transitions				
Fade				
Fade out	✓		✓	✓
Fade in	✓		✓	✓
Dissolve	✓			
Cross-fades	✓		✓	
Wipe		✓		
Quick/Whip		✓		
Audio	✓		✓	
Sound Types				
Actual Sound	✓	✓	✓	
Sound effects	✓	✓	✓	✓
Atmos sound	✓	✓	✓	✓
Voice over	✓	✓	✓	
Cuts				
Cross cut	✓	✓		
Continuity cut	✓	✓	✓	✓
Compilation cuts		✓		
Split editing	✓		✓	
Parallel cutting				
Classical cutting	✓		✓	✓
Editing effects				
Cutaways	✓	✓	✓	
Insert	✓	✓	✓	
Subliminal cuts				
Flashbacks		✓	✓	
Freeze-frames	✓	✓		
Frequency	✓	✓		
Duration				
Montages	✓	✓		
Rhythm	✓	✓	✓	
Reverse shot	✓	✓	✓	
Shot length				
Same length			✓	
Slow cutting	✓			
Fast cutting	✓	✓		
Cut to beat/music	✓	✓		



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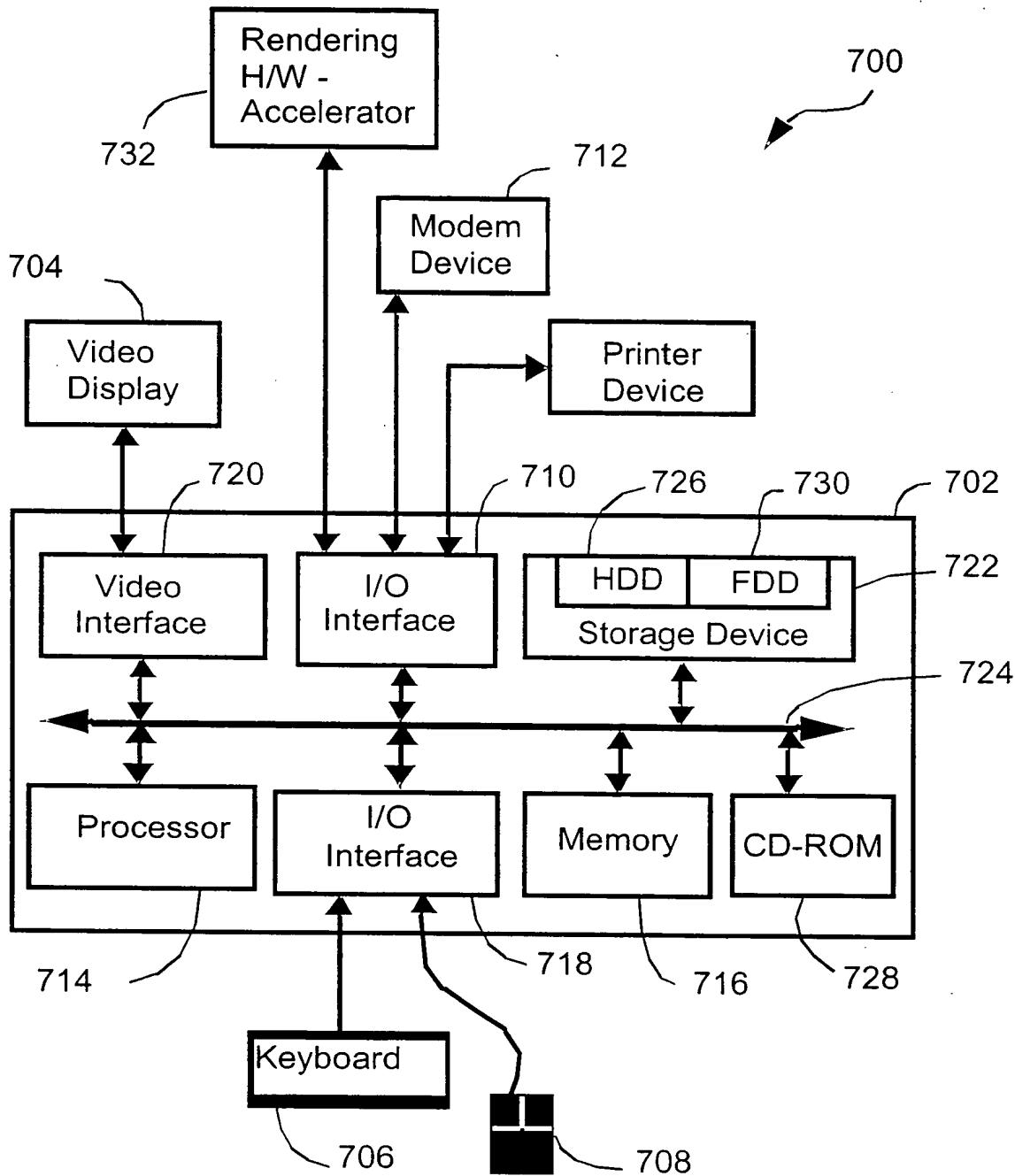


FIG. 7

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Fig. 14A

Movie Director Example Implementation (Pseudo-code)

```

main()
begin
    create rule list
    create parameter list
    create item list
    create rule syntax table

    get template file name
    load(template_file_name)

    get render script file name
    create render script file

    get input content file names
    create content list
    contentparse(content_list, input_content_file_names, ...)

    ruleparse(installed_rules, content_list, render_script_file)
    save render_script_file
    close render_script_file
    exit
end

load(template_file_name)
begin
    while(not end of template_file)
    begin
        get next item
        if (item_type == reference)
            resolve(item)
        else if (item_type == rule)
            install rule_name
        else if (item_type == parameter)
            write(parameter_list, parameter_name)
        else if (item_type == rule_syntax_extension)
            write(rule_syntax_table, rule_syntax_extension)
        else
            write(item_list, item_name)
    end
end

resolve(reference_name)
begin
    if (reference_type == provided_content)

```

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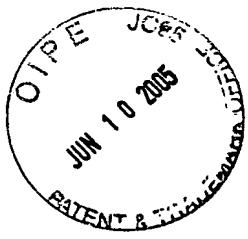


Fig. 14B

```

begin
  get provided content file name
  contentparse(content_list, provided_content_file_name)
end
else
  get referenced item
end
end

contentparse(content_list, content_file_name, ...)
begin
  while(not last content item)
  begin
    if(content_file_name_type == directory)
    begin
      get directory contents
      contentparse(content_list,
                   directory_content_file_names,...)
    end
    else
      begin
        get content information
        write(content_list, content_file_name, content_information)
      end
    end
  end
end

ruleparse(rule_list, content_list, render_script_file_name)
begin
  create instruction list
  while (not last rule)
  begin
    get rule
    decode(instructions, operands, rule, content_references,
           parameter_references, item_references)
  end

  get instruction list
  while (not last instruction)
  begin
    execute instruction(operands)
  end
end

decode(instructions, operands, rule, content_references, parameter_references,
       item_references)
begin
  while (not end of rule)

```

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```
begin
  get next portion
  if (portion_type == instruction)
    begin
      read(portion)
      convert portion according to rule syntax table
      write(instruction_list, instruction)
    end
  else
    begin
      read(reference)
      convert portion according to rule syntax table
      write(instruction_list, operand)
    end
  end
end
```

Fig. 14C

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Fig. 15A

Movie Builder Example Implementation (Pseudo-code)

```
main()
begin
    get render script file name
    get destination movie file name
    open render script file
    create qt_movie_file
    parse(render_script_file, qt_movie_file)
    close render_script_file
    save qt_movie_file
    close qt_movie_file
    exit
end

parse(script_file_name, qt_movie_file)
begin
    while(not end of script_file)
    begin
        get next script file line
        parse_line(script_file_line, qt_movie_file)
    end
end

parse_line(script_file_line, qt_movie_file)
begin
    get first word of line
    if //" return
    else if "video" then
        video(script_file_line, qt_movie_file)
    else if "audio" then
        audio(script_file_line, qt_movie_file)
    else if "transition" then
        transition(script_file_line, qt_movie_file)
```

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else

flag error in script file

end

video(script_file_line, qt_movie_file)
begin

parse video paramenters

add video to qt_movie_file using QT API

end

audio(script_file_line, qt_movie_file)
begin

parse audio paramenters

add audio to qt_movie_file using QT API

end

transition(script_file_line, qt_movie_file)
begin

parse transition paramenters

add transition to qt_movie_file using QT API

end

Fig. 15B

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Template Example Implementation (Pseudo-code)

```

//Action Template
cut_order = chronological
structure = 10s, 4s, ...
intraclip_cutting = 2
intraclip_spacing = 2s
avoid_cutting = 1s, -1s
cut_method = random, clip
play_order = forward
structure_transition = 3, 4, crossfade //3-4 frame crossfade
beat_synchronise = true           //sync video clip lengths to music beat
back_track = action               //specify backing music characteristics
audio_action = mute_all           //remove all original audio
title = action_title
end_title = action_end_title

//function definition

length check_fit(content-length, structure, intraclip_spacing, intraclip_cutting,
                  avoid_cutting)
begin
    length = content_length - avoid_cutting[0] + avoid_cutting[1] - structure[0]
    x = intraclip_cutting
    while (x > 1)
        begin
            x = x - 1
            length = length - structure[x] - intraclip_spacing[x]
        end
    return length
end

```

Fig. 16A

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```

main() //start
begin
    trim (title, beat_synchronise, structure_transition)
    assemble_edit (output, title, play_order, structure_transition, audio_action,
                   back_track)
    while not (completed content list)
    begin
        get next content (cut_order)
        excess = check_fit (content_length, structure, intraclip_cutting,
                           intraclip_spacing, avoid_cutting)
        if (excess > 0)
        begin
            y = 0
            cut_start = cut_method(excess)
            cut_end = 0
            while (y < intraclip_cutting)
            begin
                cut_end = cut (avoid_cutting + cut_start + cut_end,
                               structure[y])
                y = y + 1
                cut_start = excess - cut_start
            end
        end

        trim (current_clips, beat_synchronise, structure_transition)
        assemble_edit (output, current_clips, play_order, structure_transition,
                       audio_action, back_track)
    end
    trim (end_title, beat_synchronise, structure_transition)
    assemble_edit (output, end_title, play_order, structure_transition, audio_action,
                   back_track)
end //finish

```



Fig. 16B